

Trend Study 25A-2-04

Study site name: Black Mountain .

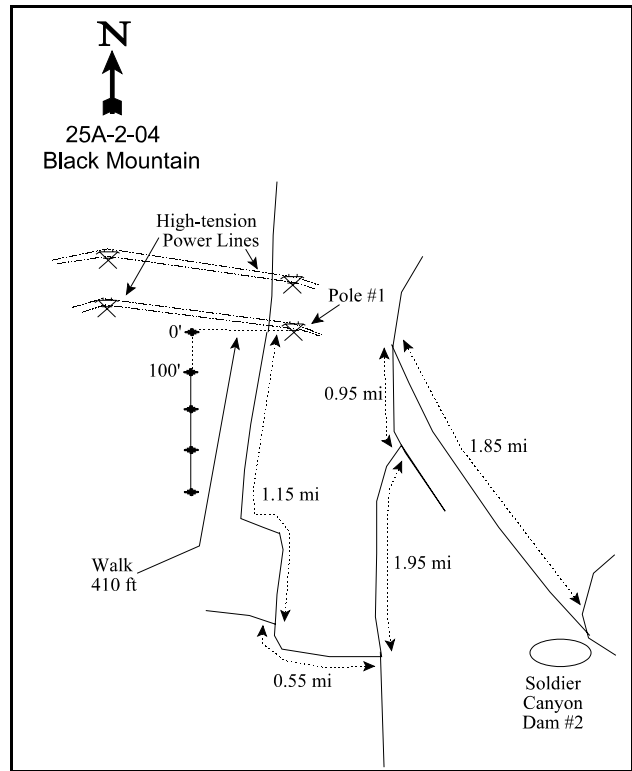
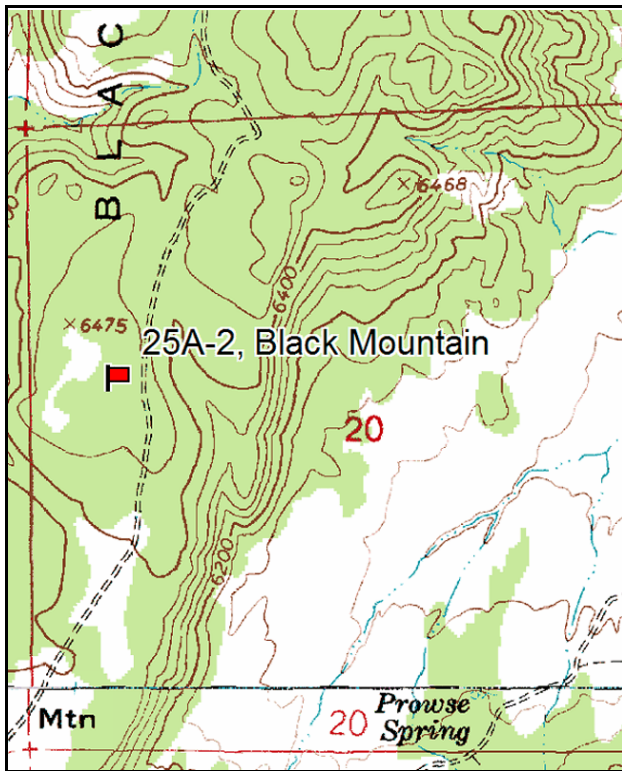
Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Soldier Canyon Dam #2, proceed 1.85 miles west on the Soldier Canyon Road to the Black Mountain Road. Make a sharp left turn onto this road and travel south-southeast 0.95 miles to a junction. Take the right fork 0.85 miles to the double high-tension powerlines. The transect starts under these lines on the mesa to the right. Continue 1.1 miles beyond the powerlines to a 90-degree fork to the right. Turn right and go 0.55 miles to another fork. Stay to the right and proceed 1.15 miles up the hill and across a chaining until you are between the powerlines. Starting from the pole (#1) east of the road, pace off 410 feet west directly under the lines to the start of the frequency baseline which is 10 feet to the right. The 0 foot post is marked with browse tag #7028.



Map Name: Salina, Utah

Diagrammatic Sketch

Township 22S , Range 1E , Section 20

GPS: NAD 27, UTM 12S 4303753 N, 428085 E

DISCUSSION

Black Mountain - Trend Study No. 25A-2

The Black Mountain trend study was Ely chained and seeded in 1984. Slope is less than 5% with a slight southern aspect and an elevation of 6,400 feet. The distance to free water (at least 1.5 to 2 miles) has limited livestock use of the area. Cattle have grazed the area for the past 30 or more years, but historically it has had only light to moderate use. Before then, there was heavy pressure from sheep and deer. Cattle now use the area in late spring for about two weeks on their way to summer range as part of the Browns Hole allotment. Deer use averaged 27 deer days use/acre (68 dd/ha) from 1985 to 1991 on a nearby pellet group transect. In the past, elk use has been light most years with three elk days use/hectare being reported in the winter of 1983-84 (Jense et al. 1985). Pellet group data from 1999 estimated 38 elk (93 edu/ha), 78 deer (192 ddu/ha), 24 cow days use/acre (59 cdu/ha). Pellet group data from 2004 estimated 20 elk (50 edu/ha), 52 deer (127 ddu/ha), and 12 cow days use/acre (30 cdu/ha) from the last spring.

The soil has a sandy clay loam texture with a slightly alkaline pH (7.6). It is moderately shallow with an estimated effective rooting depth under 12 inches. A gravelly layer is present approximately 12 inches below the surface. Soil organic matter is higher than expected at this site at 3.5%. Phosphorus is low at 5.7 ppm as values below 10 ppm may limit normal plant growth and development. Relative percent bare ground cover was 35% in 1999 and 23% in 2004, which is not excessive for a characteristically dry area that was chained. The erosion condition class determined soil movement as stable in 2004.

Black sagebrush is the dominate key preferred browse, although stickyleaf low rabbitbrush is the most abundant browse species. Black sagebrush density has decreased from 999 plants/acre in 1985, to 600 in 1991, 860 in 1999, and 540 in 2004. The increase in 1999 was due to a high proportion of young plants in the population, although it would seem that many did not survive to maturity. Percent decadence has fluctuated from 33% in 1991, to 5% in 1999, to a high of 63% in 2004. Almost half of the black sagebrush population was consider to be dying in 2004. Use was light to moderate and vigor was poor in 2004. This population of black sagebrush is in an unstable state and has the potential of disappearing from this site with continuing drought. A few mountain big sagebrush plants were sampled in 1999 and 2004. This species was included in the seed mix, however this is a marginally dry site for this species. Plants are low in stature and moderately hedged.

Stickyleaf low rabbitbrush is the most numerous shrub on the site; estimated at 2,200 plants/acre in 1999 and 1,400 in 2004. There was moderate use on rabbitbrush in 1999 and only light use in 2004. It appears that dwarf rabbitbrush (*Chrysothamnus depressus*) was misidentified in 1985 and 1991. All of the rabbitbrush encountered in 1999 were stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*). The chaining effectively removed the dominant overstory of mature juniper-pinyon and reduced it to widely scattered young trees. Density for juniper in 1999 was estimated at 72 trees/acre and pinyon was estimated at 23 trees/acre.

Grass composition is dominated by a variety of seeded and native perennial species. Indian ricegrass and bottlebrush squirreltail were the most abundant native perennial grasses in 1999 and 2004. Seeded species such as crested and intermediate wheatgrass, smooth brome, Russian wildrye, and sheep fescue are present, although less abundant except for crested and intermediate wheatgrass. Most of the perennial species displayed moderate to heavy use in 1999 and only light use in 2004. Cheatgrass was the most common herbaceous species in 1999, but decreased significantly, while crested wheatgrass increased significantly. Forb density and diversity is low. Annual increasers such as Russian thistle and prickly lettuce were most common immediately after the chaining. Since then forbs have nearly disappeared from the understory. Only four species were sampled in 1999 and three in 2004, with pale alyssum and bur buttercup, both annuals, being the most abundant in cover and frequency. The seeded forbs, alfalfa, small burnet, and yellow sweet clover,

were not sampled in 1999 or 2004.

1985 APPARENT TREND ASSESSMENT

Trend will depend upon the success of the seeding. Any assessment this soon would be tentative at best. However, it would appear that trend of both soils and vegetative composition can only be up.

1991 TREND ASSESSMENT

This site is dryer than the Triangle Mountain site (25A-1) and is evident by the slow recovery for most species on this chained site. Most of the seeded grasses are increasing in sum of nested and quadrat frequency values, but it has been slow because of the prolonged drought. The major three native grasses are also increasing in numbers and distribution (bluebunch wheatgrass, Indian ricegrass, and bottlebrush squirreltail). The alfalfa that was seeded has almost disappeared now. The black sagebrush is also showing the effects of the drought. It's population has decreased by 40% and percent decadency has increased to 33%. These are not good signs, but with a change in the weather patterns, we would expect the grasses and black sagebrush to recover. Because of these decreases in vegetation, percent bare ground has increased dramatically from 20% to 38%. However, litter cover has remained similar and nested frequency of grasses and forbs have increased.

TREND ASSESSMENT

soil - slightly down (2)

browse - down (1)

herbaceous understory - slightly up (4)

1999 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Herbaceous vegetation and litter are low for a chained and seeded site due to the shallow soils and drought. Relative percent bare ground cover is moderately high at 35% cover, but the gentle slope holds erosion to minimal levels. Trend for browse is stable overall. Black sagebrush, the most numerous preferred species, shows a 30% increase in density. It also has high recruitment from young plants at 21%. Percent decadency is low at 5% with light to moderate use. On a negative note, stickyleaf low rabbitbrush is the most numerous species on the site, increasing by 73% since 1991. It appears that this species will continue to increase with the young age class making up 25% of its population. The herbaceous understory shows a stable trend for grasses, while forbs continue to decline. Perennial forbs are nearly nonexistent and annual grasses and forbs are increasing. Perennial forbs, primarily the seeded species, have disappeared from the understory altogether. Perennial grasses have remained fairly stable in their sum of nested frequency overall, but show moderate to heavy use. The Desirable Components Index rated this site as good with a score of 47 due to low shrub cover, good perennial grass cover, and many young shrubs.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

winter range condition (DC Index) - 47 (good) Black sagebrush type

2004 TREND ASSESSMENT

Trend for soil is considered slightly down. There was a slightly improvement for relative percent bare ground cover which went down from 35% to 23%. However, percent relative cover of pavement increased from 13% in 1999 to 28% in 2004. Increase in pavement cover would suggest soil loss has increased exposing more pavement. Increase in pavement has the potential to increase overland flows, reducing infiltration into the soil.

Bare ground decreased in percent cover also suggesting soil loss. Trend for key browse black sagebrush is down. Density has decreased from 860 plants/acre in 1999 to 540 in 2004. About half of the current population was classified as dying. No recruitment of young was recorded in 2004. Trend for herbaceous understory is stable with only a slight decrease in perennial grass sum of nested frequency. Nested frequency for crested wheatgrass increased significantly, however two other perennial species decreased while cheatgrass decreased significantly. Forbs lack diversity and most are all small annuals species that contribute little to total cover. The Desirable Components Index rated this site as poor with a score of 23 due to high decadency, low shrub cover, but good perennial grass cover.

TREND ASSESSMENT

soil - down slightly (2)

browse - down (1)

herbaceous understory - stable (3)

winter range condition (DC Index) - 23 (poor) Black sagebrush type

HERBACEOUS TRENDS --

Management unit 25A, Study no: 2

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
G	Agropyron cristatum	_a 14	_b 57	_{ab} 41	_c 98	.75	3.25
G	Agropyron intermedium	_a 9	_c 88	_{ab} 42	_b 55	.89	1.26
G	Agropyron smithii	4	-	-	-	-	-
G	Agropyron spicatum	_a 5	_b 45	_a 6	_a 10	.09	.48
G	Bromus inermis	_a 4	_a 6	_b 73	_a 11	1.20	.12
G	Bromus tectorum (a)	-	-	_b 133	_a 14	1.31	.18
G	Elymus junceus	_a -	_b 9	_b 12	_b 6	.11	.22
G	Festuca ovina	_a -	_{ab} 10	_b 27	_a 2	.37	.00
G	Oryzopsis hymenoides	68	77	95	105	2.92	4.10
G	Poa fendleriana	2	-	6	2	.06	.03
G	Poa secunda	-	-	5	5	.06	.04
G	Sitanion hystrix	49	89	80	79	1.58	2.74
Total for Annual Grasses		0	0	133	14	1.31	0.18
Total for Perennial Grasses		155	381	387	373	8.06	12.25
Total for Grasses		155	381	520	387	9.38	12.44
F	Alyssum alyssoides (a)	-	-	_b 189	_a 137	.62	1.31
F	Antennaria rosea	6	-	-	-	-	-
F	Astragalus spp.	_a 4	_b 30	_a 14	_a -	.11	-
F	Castilleja spp.	-	2	-	-	-	-
F	Chaenactis douglasii	_a -	_b 12	_a -	_a -	-	-
F	Cryptantha spp.	-	-	1	-	.00	-
F	Erigeron engelmannii	-	2	-	-	-	-
F	Eriogonum ovalifolium	_a -	_b 14	_a -	_a -	-	-

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
F	Gilia spp. (a)	-	-	-	10	-	.02
F	Lactuca serriola	a ⁻	b ⁷	a ⁻	a ⁻	-	-
F	Machaeranthera canescens	-	4	-	-	-	-
F	Medicago sativa	b ¹⁴	a ¹	a ⁻	a ⁻	-	-
F	Phlox longifolia	a ⁻	b ¹²	a ⁻	a ⁻	-	-
F	Ranunculus testiculatus (a)	-	-	a ⁻	b ¹⁷⁴	-	1.11
F	Salsola iberica (a)	a ¹	b ¹⁹	a ⁻	a ⁻	-	-
F	Sanguisorba minor	b ²⁹	a ¹	a ⁻	a ⁻	-	-
F	Senecio multilobatus	3	-	-	-	-	-
F	Streptanthus cordatus	2	2	-	-	-	-
F	Taraxacum officinale	-	1	-	-	-	-
F	Tragopogon dubius	-	3	10	-	.02	-
F	Unknown forb-perennial	-	2	-	-	-	-
Total for Annual Forbs		1	19	189	321	0.62	2.45
Total for Perennial Forbs		58	93	25	0	0.13	0
Total for Forbs		59	112	214	321	0.75	2.45

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 25A, Study no: 2

T y p e	Species	Strip Frequency		Average Cover %	
		'99	'04	'99	'04
B	Artemisia nova	26	16	1.70	1.03
B	Artemisia tridentata vaseyana	1	2	-	.12
B	Chrysothamnus viscidiflorus viscidiflorus	42	36	2.12	1.97
B	Juniperus osteosperma	8	4	1.83	2.27
B	Pinus edulis	1	0	.03	.15
Total for Browse		78	58	5.70	5.55

CANOPY COVER, LINE INTERCEPT --
Management unit 25A, Study no: 2

Species	Percent Cover
	'04
Artemisia nova	1.50
Chrysothamnus viscidiflorus viscidiflorus	4.55
Juniperus osteosperma	1.81

POINT-QUARTER TREE DATA --
Management unit 25A, Study no: 2

Species	Trees per Acre		Average diameter (in)	
	'99	'04	'99	'04
Juniperus osteosperma	72	-	2.3	-
Pinus edulis	23	-	1.7	-

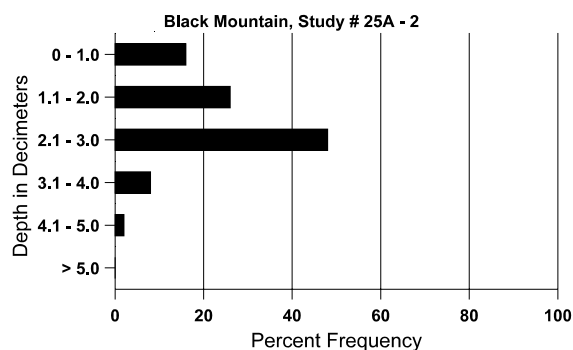
BASIC COVER --
Management unit 25A, Study no: 2

Cover Type	Average Cover %			
	'85	'91	'99	'04
Vegetation	1.50	3.00	18.36	19.96
Rock	1.75	3.25	4.71	4.80
Pavement	30.25	14.00	11.60	31.67
Litter	46.50	42.00	21.79	29.77
Cryptogams	0	0	.05	1.04
Bare Ground	20.00	37.75	29.98	26.72

SOIL ANALYSIS DATA --
Management unit 25A, Study no: 2, Study Name: Black Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	%0M	PPM P	PPM K	ds/m
11.7	61.3 (10.9)	7.6	50.0	25.1	24.9	3.5	5.7	316.8	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 25A, Study no: 2

Type	Quadrat Frequency		Days use per acre (ha)	
	'99	'04	'99	'04
Rabbit	18	56	-	-
Elk	15	16	38 (93)	20 (50)
Deer	24	39	78 (192)	52 (127)
Cattle	16	6	24 (59)	12 (30)

BROWSE CHARACTERISTICS --

Management unit 25A, Study no: 2

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>												
85	999	-	-	866	133	-	7	0	13	-	0	6/7
91	600	-	-	400	200	-	0	0	33	-	0	8/11
99	860	20	180	640	40	20	40	0	5	-	0	11/18
04	540	-	-	200	340	160	22	15	63	48	48	11/18
<i>Artemisia tridentata vaseyana</i>												
85	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
99	40	-	40	-	-	60	100	0	0	-	0	13/16
04	40	-	-	20	20	-	50	50	50	50	50	11/15
<i>Chrysothamnus depressus</i>												
85	533	-	-	400	133	-	0	0	25	-	0	7/7
91	266	-	66	200	-	-	0	0	0	-	0	13/14
99	0	-	-	-	-	-	0	0	0	-	0	-/-
04	0	-	-	-	-	-	0	0	0	-	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
85	0	-	-	-	-	-	0	0	0	-	0	-/-
91	599	66	266	333	-	-	0	0	0	-	0	15/19
99	2200	40	540	1600	60	40	20	16	3	-	16	14/22
04	1400	-	-	1340	60	120	0	6	4	3	3	13/23
<i>Juniperus osteosperma</i>												
85	132	-	66	-	66	-	0	0	50	-	0	-/-
91	66	-	66	-	-	-	0	0	0	-	0	-/-
99	160	20	120	40	-	160	0	0	0	-	0	-/-
04	80	-	20	60	-	-	25	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Pinus edulis												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
99	20	-	20	-	-	40	0	0	-	-	100	-/-
04	0	-	-	-	-	20	0	0	-	-	0	-/-